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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/997,219

11/30/2001

Mark J. Davis

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7590

03/07/2003

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EXAMINER

JAGAN, MIRELLYS

ART UNIT

PAPER NUMBER

2859

DATE MAILED: 03/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/997,219

Applicant(s)

DAVIS ET AL.

Examiner

Mirellys Jagan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Objections

1. Claim 6 is objected to because of the following informalities:

There is lack of antecedent basis in the claim for "said material" in line 1. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2, and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by the publication titled "Dimensional Stability of Materials Useful in Optical Engineering" by Jacobs.

Jacobs discloses that it is known to determine the thermal expansion of a material by utilizing a Fabry-Perot etalon having an optical path therethrough. The thermal expansion of the material is determined by determining the position of resonant peaks of the material at different temperatures, and calculating the thermal expansion of the material from the differences in frequency of the positions at each temperature.

Jacobs teaches that determining the thermal expansion is based on the relationship between the length (L) of the etalon along the optical path and the frequency (f) of the peak at a

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first temperature (T) and uses the equation $\Delta f/f = \Delta L/L$, wherein the thermal expansion (α) is determined by the following equation: $\alpha \equiv \Delta L/(L\Delta T)$.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jacobs in view of the publication titled "Optics" by Hecht et al [hereinafter Hechts].

Jacobs discloses a method having all of the limitations of claim 3, as stated above in paragraph 3, except for the wavelength of the position of the peaks being measured.

Hecht discloses that, for etalons, there is a correlation between the frequency and the wavelength of a peak: $|\Delta v| = |(c\lambda_0)/\lambda_0^2|$.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method disclosed by Jacobs by measuring the wavelength of the peaks instead of the frequency since Hechts teaches that a wavelength measurement can be obtained for etalons and converted to a frequency measurement.

6. Claims 4, 5, 8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jacobs in view of the prior art disclosed by applicant [hereinafter Prior Art].

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Jacobs discloses a method having all of the limitations of claims 4, 5, 8, and 10, as stated above in paragraph 3, except for the etalon being a solid etalon consisting essentially of a solid sample of the material having highly flat end surfaces or an air-gap etalon consisting essentially of an air gap formed between two highly flat plates, the end surfaces of the etalon having $\lambda/20$ flatness or better, <0.5 arc second parallelism or better, and a finesse of 1-1000.

The Prior Art discloses that solid etalons and air-gap etalons each having $\lambda/20$ flatness or better, <0.5 arc second parallelism or better, and a finesse of 1-1000 are known and are commercially available to the public by several companies. The solid etalons consist essentially of a solid sample of a material having highly flat end surfaces, and the air-gap etalons consist essentially of an air gap formed between two highly flat plates.

Referring to claims 4, 5, 8, and 10, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method disclosed by Jacobs by utilizing a solid or an air-gap etalon each having $\lambda/20$ flatness or better, <0.5 arc second parallelism or better, and a finesse of 1-1000 since the Prior Art discloses that solid and air-gap etalons each having $\lambda/20$ flatness or better, <0.5 arc second parallelism or better, and a finesse of 1-1000 are known and commercially available types of etalons that a person having ordinary skill in the art at the time the invention was made would have been able to provide using routine experimentation in order to determine the thermal expansion of a substance as already suggested by Jacobs.

7. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jacobs.

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Jacobs discloses a method having all of the limitations of claim 9, as stated above in paragraph 3, except for the number of peaks measured being ten or more.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the method disclosed by Jacobs by measuring ten or more peaks since it has been held that, where the general conditions of a claim disclosed in the prior art, discovering the "optimum range" involves only routine skill in the art. See *In re Aller*, 105 USPQ 233 (CCPA 1995).

8. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jacobs in view of U.S. Patent 6,005,995 to Chen et al [hereinafter Chen].

Jacobs discloses a method having all of the limitations of claim 7, as stated above in paragraph 3, except for the frequency of the peaks being in the range of 1300-1700 nm.

Chen discloses that etalons are commonly used in the telecommunications field. The useful peak range for these etalons is 1300-1700 nm.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method disclosed by Jacobs by utilizing an etalon having peaks in the range of 1300-1700 nm, as disclosed by Chen, in order to measure the thermal expansion of an etalon that is commonly used in the art.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents and publication disclose that etalons experience thermal expansion due to a change in temperature:

U.S. Patent 6,270,254 to Berthold et al

U.S. Patent 5,384,877 to Stone

U.S. Patent Application Publication 2002/0044574 to Abedin

U.S. Patent 4,782,492 to McMahon et al

The following patents disclose measuring thermal expansion of a material:

U.S. Patent 3,938,889 to McKinnis

Japanese Patent 01269040 to Yamamoto

Japanese Patent 01119748 to Takasaki et al

The following patents and publication disclose etalons:

U.S. Patent 6,186,937 to Ackerman et al

U.S. Patent Application Publication 2003/0030908 to Cheng et al

U.S. Patent 6,101,201 to Hargis et al

U.S. Patent 6,462,876 to O'Brien

U.S. Patent 3,909,132 to Barrett

Japanese Patent 02017421 to Sonobe

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10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mirellys Jagan whose telephone number is 703-305-0930. The examiner can normally be reached on Monday-Thursday from 8AM to 4PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez can be reached on 703-308-3875. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7725 for regular communications and 703-308-7725 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

mj
March 5, 2003



Diego Gutierrez
Supervisory Patent Examiner
Technology Center 2800